What is claimed is:

1. An optical signal generation circuit, having a directional coupler comprising a first waveguide; a second waveguide; and a coupled waveguide region obtained by placing parts of the first and second waveguides in proximity to each other, wherein:

an optical NRZ signal having a first wavelength and an RZ pulse train having the first wavelength are inputted on the input side of the first waveguide of said optical signal generation circuit;

a nonlinear phase shift based on cross-phase modulation is induced in said RZ pulse train by said optical NRZ signal in said coupled region; and

pulses corresponding to said optical NRZ signal are selected from the individual RZ pulses constituting said RZ pulse train and are outputted from the output end of said first waveguide.

2. An optical signal generation circuit, having a directional coupler comprising a first waveguide; a second waveguide; and a coupled waveguide region obtained by placing parts of the first and second waveguides in proximity to each other, wherein:

an optical NRZ signal having a first wavelength and an RZ pulse train having a second wavelength are inputted on the input side of the first waveguide of said optical signal generation circuit;

a nonlinear phase shift based on cross-phase modulation is induced in said RZ pulse train by said optical NRZ signal in said coupled region; and

pulses corresponding to said optical NRZ signal are selected from the individual RZ pulses constituting said RZ pulse train and are outputted from the output end of said first waveguide.

3. An optical signal generation circuit as defined in claim 2, wherein:

a band-pass filter for blocking said first wavelength is provided to the output end of said first waveguide; and

the optical NRZ signal leaked into said first waveguide is removed.

4. An optical signal generation circuit as defined in claim 2, comprising:

an optical band-pass filter disposed at the output end of said second waveguide and designed to block said first wavelength; and

a receiver disposed at a subsequent stage of the optical band-pass filter and designed to receive said second wavelength; wherein

the optical NRZ signal leaked into said second waveguide is removed, and pulses that do not correspond to said optical NRZ signal are selected from the individual pulses

constituting said RZ pulse train and are received by said receiver.

5. An optical signal generation circuit, comprising an input port;

a first output port and a second output port; and

an Y-branch light waveguide for guiding signal light introduced through said input port toward said first and second output ports; wherein:

said optical signal generation circuit is such that an optical NRZ signal having a first wavelength and an RZ pulse train having a second wavelength are inputted to said input port; and

a nonlinear phase shift based on cross-phase modulation is induced in said RZ pulse train by said optical NRZ signal in said Y-branch light waveguide to control the mode of said RZ pulse train;

whereby pulses corresponding to said optical NRZ signal are selected from the individual RZ pulses constituting said RZ pulse train and are outputted from either said first or second optical pulses.

6. An optical signal generation circuit as defined in claim 5, wherein said Y-branch light waveguide is a light waveguide for transmitting the primary guided wave mode and the first guided wave mode of an inputted optical signal.

7. An optical signal generation circuit as defined in claim 6, wherein an optical band-pass filter for blocking said first wavelength is provided to the output port for outputting the RZ pulses corresponding to said optical NRZ signal, and the optical NRZ signal leaked into said first output port is removed.

8. An optical signal generation circuit as defined in claim 7, wherein an optical band-pass filter for blocking said first wavelength is provided to the output port for outputting RZ pulses that do not correspond to said optical NRZ signal, and the optical NRZ signal leaked into said first output port is removed.

9. An optical signal generation circuit as defined in claim 7, wherein:

a receiver for receiving said second wavelength is provided to a subsequent stage of said optical band-pass filter; and

the optical NRZ signal leaked to the optical pulse for outputting the RZ pulses that do not correspond to said optical NRZ signal is removed, and the RZ pulses that do not correspond to said optical NRZ signal are received by said receiver.

10. An optical signal generation circuit, comprising a light waveguide and a polarizer connected to this light waveguide, wherein:

said light waveguide receives an optical NRZ signal having a first polarization direction and an RZ pulse train having a second polarization direction at 45° to the said first polarization direction;

a nonlinear phase shift based on cross-phase modulation is induced in said RZ pulse train by said optical NRZ signal inside said light waveguide; and

said polarizer extracts pulses corresponding to said optical NRZ signal from the individual RZ pulses constituting the RZ pulse train.

11. An optical signal generation circuit, comprising a light waveguide and a polarization beam splitter connected to this light waveguide, wherein:

said light waveguide receives an optical NRZ signal having a first polarization direction and an RZ pulse train having a second polarization direction at 45° to the said first polarization direction;

a nonlinear phase shift based on cross-phase modulation is induced in said RZ pulse train by said optical NRZ signal inside said light waveguide;

said polarization beam splitter transmits pulses corresponding to said optical NRZ signal from among the individual RZ pulses constituting said RZ pulse train, and

reflects pulses that do not correspond to said optical NRZ signal from among the individual RZ pulses constituting said RZ pulse train; and

the RZ pulses that do not correspond to said optical NRZ signal and that have been reflected by said polarization beam splitter are received by a receiver.

12. An optical transmission line, comprising an optical fiber transmission line for transmitting optical pulses;

first dispersion compensation means connected to a preceding stage of the optical fiber transmission line; and

second dispersion compensation means connected to a subsequent stage of the optical fiber transmission line; wherein:

said first dispersion compensation means is composed of a dispersion-shifted fiber, and said second dispersion compensation means is composed of a dispersion-compensated fiber.

13. An optical transmission line as defined in claim 12, wherein the dispersion value of said first dispersion compensation means is set to near-zero level, and the dispersion value of said second dispersion compensation means is set to a negative value.

14. An optical fiber transmission line as defined in claim 12, wherein the dispersion value of said first

dispersion compensation means is set to normal dispersion, and the dispersion value of said second dispersion compensation means is set to a negative value.

15. An optical transmission line as defined in claim 13, wherein the pulse widening in said optical fiber transmission line is controlled by a nonlinear chirp induced in said first dispersion compensation means.

16. An optical transmission line, comprising:

an optical fiber transmission line for transmitting optical pulses;

first dispersion compensation means connected to a preceding stage of the optical fiber transmission line; and

second dispersion compensation means connected to a subsequent stage of the optical fiber transmission line; wherein:

said first dispersion compensation means is composed of two optical fibers, which are combined to provide, on average, zero dispersion;

the optical fibers are capable of providing said first dispersion compensation means with a very low pre-chirp as an input; and

the widening of said optical pulses in said transmission fiber is controlled by the effect of this pre-chirp and of a chirp based on self-phase modulation and induced in said fist dispersion compensation means.

17. An optical transmission line as defined in claim 16, wherein:

a variable optical attenuator is provided to a preceding stage of said transmission fiber; and

the pulse interaction that accompanies the nonlinearity of said transmission fiber is reduced by controlling the optical intensity of the optical pulses inputted to said transmission fiber.

18. An optical transmission line as defined in claim 14, wherein the pulse widening in said optical fiber transmission line is controlled by a nonlinear chirp induced in said first dispersion compensation means.

19. An optical transmission line as defined in claim 12, wherein the pulse widening in said optical fiber transmission line is controlled by a nonlinear chirp induced in said first dispersion compensation means.